REMARKS

Claims 1-9 and 14-17 are presently pending in the captioned application. No claim amendments are currently made to the captioned application.

Applicants acknowledge the Examiner's indication that a translation of the foreign priority document is requested. Applicants proffer the English translation along with the certification, which will be filed as soon as it has been received from overseas.

Applicants also acknowledge the Examiner's indication that the single outstanding rejection under 35 U.S.C. § 103(a) can be overcome by submitting evidence of common ownership of the cited U.S. Patent No. 6,156,906 ("Hyoda *et al.*") reference being that the captioned application was filed on or after November 29, 1999. The evidence showing such common ownership is contained within an Exhibit A, which is the results page of a query to the Patent Office website.

Exhibit A shows that the execution date of the assignment for the reference patent, Hyoda *et al.*, was July 21, 1999. Since the foreign priority document JP 83714/00 of the captioned application has a filing date of March 24, 2000, and the captioned application was assigned to the same assignors as the reference patent, it is

clear that the captioned application was subject to an obligation of assignment to the same entities at the time the invention was made.

Applicants further note that the secondary reference EP 1035118 A1 ("EP '118") is not a proper reference under any provision of § 102. EP '118 was published on September 13, 2000, which is less than one year prior to the captioned application U.S. filing date of March 22, 2001. Furthermore, EP '118 is not a U.S. patent application and cannot be cited as § 102(e) art. Applicants do not need to rely on the foreign priority document and hence the English translations thereof to overcome the reference.

Accordingly, Applicants respectfully request the Examiner to reconsider the rejection in view of the remarks and request withdrawal of the rejection and an allowance of all the presently pending claims.

1. **Rejection of Claims 1-9 and 14-17 under 35 U.S.C. § 103(a)**

The Office Action rejects claims 1-9 and 14-17 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,156,906 ("Hyoda *et al.*") in view of EP 1035118 A1 ("EP '118"). The Office

Action states:

> Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.
>
> The applied U.S. reference has a common assignee and shares inventors with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(1)(1) and § 706.02(1)(2).
>
> ***Applicants are claiming the following process:*** A process for preparing 5,5'-bi-1H-tetrazolediammonium salts (BHT-2NH3) The 5,5'-bi-1H-tetrazolediammonium salts (BHT-2NH_3) are prepared by dissolving the oxaldiimidic acid

dihydrazide (OAH) (obtained by the reaction of hydrated hydrazide with dicyan in an aqueous solution of a weakly acidic compound), drop wise adding an aqueous solution of sodium nitrite thereto to form an azide thereof and to effect the cyclization reaction by heating, adding an aqueous solution of sodium hydroxide to the reaction product to convert it into a 5,5'-bi-1H-tetrazoledisodium salt (BHT-2Na), reacting it with an aqueous solution of ammonium chloride, and recovering the formed ammonium salt as sparingly soluble crystals.

Determination of the scope and content of the prior art (MPEP §2141.01)

The U.S. 6,156,906 patent teaches the synthesis of a 5,5'-bi-1H-tetrazolediammonium salt (BHT-2NH_3) from hydrogen cyanide, sodium azide and hydrogen peroxide water in the presence of a catalytic amount of copper sulfate while adjusting the PH of the reaction solution to be 5 to 6.

The EP 1035118 document teaches the synthesis of a 5,5'-bi-1H-tetrazolediammonium salt from dicyan and an aqueous solution of sodium azide/ammonium chloride.

Ascertainment of the difference between the prior art and the claims (MPEP §2141.02)

A sodium azide must be used in each of the aforementioned processes.

Finding of prima facie obviousness—rational and motivation (MPEP §2141-2143)

The skilled artisan is deemed to be aware of all of the relevant teachings of the synthesis of a 5,5'-bi-1H-tetrazolediammonium salt (BHT-2NH_3) via cyclization of an oxaldiimidic acid dihydrazide (OAH). In fact, Applicant's cite several processes ("Prior Art 1-7"), previously known in the field, in the

specification. By Applicants' own admission, the present inventors have already proposed the synthesis of a 5,5'-bi-1H-tetrazolediammonium salt from dicyan and an aqueous solution of sodium azide/ammonium chloride (pages 3-4 of the specification).

The instant claimed process would have been suggested to one skilled in the art, particularly when the relevant reactants and intermediates (dicyan, oxalimidic acid dihydrazide, and 5,5'-bi-1H-tetrazole) are encompassed by the reactions defined in both references. One in possession of the references is not only is in possession of the combination of 5,5'-bi-1H-tetrazolediammonium salt preparation teachings but also the proven operability of the specific employment of claimed intermediates dicyan, OAH, and 5,5'-bi-1H-tetrazole, as well as certain reaction conditions, because of the suggested enhancement well-recognized in the art of record.

The compounds recited are of the same formulae as those discussed in both JP applications, and such would be expected to have the same ability to dissolve in the presence of an acidic substance, have an aqueous solution added in slowly to form an azide, to add heat to effect the cyclization reaction, add in an aqueous solution of a salt to produce the same 5,5'-bi-1H-tetrazoledisodium salt, and reacting with an aqueous solution of ammonium chloride to obtain the same bi-1H-tetrazolediammonium salt. Regarding dependent claims 2-4 and 14-17, the Courts have decided per *In re Boesch*, 205 USPQ 215 (1980), that the optimization of variables, such as pH and solvent, in a known process is prima facie obvious. Furthermore, one skilled in the art would expect that varying the molar concentrations and temperatures would affect the yield, as well as the cost of carrying out the production method. See *In re Aller, et*

> *al.*, (CCPA 1955) 220 F2d 454, 105 USPQ 233, "The selection of reaction conditions is mere optimization by modification of routine experimentation and within one skilled in the art. Changes in temperature, concentrations, or other process conditions of an old process does not impart patentability unless the recited ranges are critical, i.e., they produce a new and unexpected result."
>
> Therefore, absent a showing of unobvious and superior properties, the instant claimed process would have been suggested to one skilled in the art. Thus, a strong case of *prima facie* obviousness has been established.

Applicants respectfully traverse the rejection because Hyoda *et al.* and EP '118 are not properly cited as prior art against the captioned application. Applicants submit evidence showing common ownership between Hyoda *et al.*, which is cited under § 102(e), and the captioned application. Hence, Hyoda *et al.* is disqualified as prior art.

Moreover, EP '118 is not a proper reference under any provision of § 102 because EP '118 was published on September 13, 2000, which is less than one year prior to the captioned application's U.S. filing date of March 22, 2001. EP '118 also cannot be cited under § 102(e) because EP '118 is not a U.S. patent application or patent. Applicants do not need to rely on the foreign priority document and hence the English translations thereof to overcome EP '118.

Furthermore, the presently pending claims are patentably distinguishable over the cited references because the cited references fail to teach or suggest to one of ordinary skill in the art to make each and every one of the presently claimed limitations of the independent method claim 1.

Analysis

The Federal Circuit ruled that a *prima facie* case of obviousness must establish: (1) some suggestion or motivation to modify the references; (2) a reasonable expectation of success; and (3) that the prior art references teach or suggest all claim limitations. Amgen, Inc. v. Chugai Pharm. Co., 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); In re Wilson, 165 USPQ 494, 496 (C.C.P.A. 1970).

A *prima facie* case of obviousness must also include a showing of the reasons why it would be obvious to modify the references to produce the present invention. See Ex parte Clapp, 277 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). The Examiner bears the initial burden to provide some convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings. Id. at 974.

Moreover, a reference patent cited under § 102(e) does not

apply as prior art if both the application and the reference patent were subject to a claim of common ownership at the time of invention. In particular, a filing of an application under 37 C.F.R. 1.53(b) with evidence of common ownership will serve to exclude commonly owned § 102(e) prior art that was applied in a § 103 obviousness rejection. See MPEP 706.02(1)(1).

Pending claims

The presently pending claim 1 recites a process for the preparation of 5,5'-bi-1H-tetrazolediammonium salts,

> wherein oxalimidic acid dihydrazide ("OAH") is reacted with sodium nitrite in the presence of an acidic substance while maintaining the pH of the reaction solution in a range of from 4 to 6 to form 5,5'-bi-1H-tetrazole through the formation of an azide thereof, and
>
> the 5,5'-bi-1H-tetrazole is converted into 5,5'-bi-1H-tetrazoledisodium salt by the addition of sodium hydroxide,
>
> the 5,5'-bi-1H-tetrazoledisodium salt is further reacted with ammonium chloride or an aqueous solution thereof, and
>
> a formed ammonium salt is recovered as sparingly soluble crystals.

Analysis

Applicants acknowledge the Examiner's indication that the single outstanding rejection under 35 U.S.C. § 103(a) can be overcome by submitting evidence of common ownership of Hyoda *et al.* and the captioned application being that the captioned application was filed on or after November 29, 1999.

Common ownership

In the captioned application, Applicants note that both the captioned application and Hyoda *et al.* were commonly assigned to joint assignees Japan Hydrazine Co., Inc., and Masuda Chemical Industry Co., LTD. at the time of invention. The evidence submitted in an Exhibit A shows common ownership because the execution date of the assignment for the reference patent, Hyoda *et al.*, was July 21, 1999.

Since the foreign priority document JP 83714/00 of the captioned application has a filing date of March 24, 2000, and the captioned application was assigned to the same assignors as the reference patent, it is clear that the captioned application was subject to an obligation of assignment to the same entities at the time the invention was made.

EP '118 is not prior art

Applicants further note that the secondary reference EP 1035118 A1 ("EP '118") is not a proper reference under any provision of § 102. EP '118 was published on September 13, 2000, which is less than one year prior to the captioned application U.S. filing date of March 22, 2001. Furthermore, EP '118 is not a U.S. patent application and cannot be cited as § 102(e) art. Applicants do not need to rely on the foreign priority document and hence the English translations thereof to overcome the reference.

No *prima facie* obviousness

The presently pending claim 1 recites a method for producing a BHT·$2NH_4$ salt by subjecting an oxaldiimidic acid dihydrazide ("OAH") obtained by the reaction of a dicyan ("NC-CN") with a hydrated hydrazine ("H_2N-NH_2·xH_2O") and sodium nitrite ("$NaNO_2$") to the azido-linkage formation reaction in the presence of a relatively weak acidic substance such as formic acid, acetic acid, propionic acid, octanoic acid or citric acid in a reaction solution of a pH of 4 to 6 to synthesize a 5,5'-bi-1H-tetrzaole ("BHT"). The BHT is subsequently converted to obtain BHT as a disodium salt thereof and, further, converted into an ammonium salt thereof to result in the final product of the 5,5'-bi-1H-tetrazolediammonium

salt ("BHT·2NH_4") in the form of sparingly soluble crystals.

In contrast, the known method as taught by the cited reference teaches a method of reacting OAH with silver nitrate ("$AgNO_3$") and $NaNO_3$ in a strongly acidic aqueous solution of diluted nitric acid ("dil-HNO_3"), and converting the obtained BHT·2Ag salt into BHT using hydrogen sulfide ("H_2S"). However, the presently claimed method has the unexpected advantage of obtaining the BHT salt with a high yield using cheaply available materials that can be easily handled as starting materials.

In particular, it is critical that the reaction solution is maintained in a weakly acidic state of a pH of 4 to 6. This limitation results in the good reaction yields of BHT as shown by Examples 4 to 12 compared with the known methods of Comparative Examples 2 to 4 of the instant specification.

On the other hand, Hyoda *et al.* which is already disqualified as prior art teaches a method wherein hydrogen peroxide ("H_2O_2"), which is acidic with acetic acid, being added dropwise into a reaction solution obtained by adding, as a catalyst, copper sulfate ("$CuSO_4$") to sodium prussiate ("NaCN") or to potassium prussiate (KCN) and sodium azide ("NaN_3"). The oxidation and the cyclization reaction are conducted in the solution to synthesize a BHT which is, then, converted into BHT·2NH_4 with ammonium chloride ("NH_4Cl").

In other words, Hyoda *et al.* uses NaN_3 as a starting material, and is hence different from the claimed invention which does not use NaN_3 but rather $NaNO_2$.

Regarding the reaction mechanism, the presently claimed invention subjects the OAH and the $NaNO_2$ to the azido-forming reaction in the reaction system and forms an intermediate product of 1H-tetrazoleforminmidic acid hydrazide (TFAH) that forms the azido-bonded structure. Hyoda *et al.*, on the other hand, teaches that NC-CN formed in the system due to the oxidation HCN undergoes a cyclization reaction with NaN_3 having the azido-bonded structure added in advance to the system wherein the BHT (Na salt) is formed through an intermediate product of 5-cyano-1H-tetrazole sodium salt. Thus, the reaction mechanism of Hyoda *et al.* is completely different from that of the claimed invention. Clearly, one of ordinary skill in the art would not have had any motivation or suggestion to make the presently claimed limitations.

Regarding EP '118, Applicants once again reiterate that the reference is not prior art but for the sake of the record note that the reference teaches the reaction using NC-CN and NaN_3 as starting materials and is, hence, completely different from the method of our invention, and further fails to suggest or motivate one of ordinary skill in the art to make the claimed limitations.

Accordingly, Applicants respectfully submit that the presently claimed invention is not obvious over the cited references and request reconsideration and withdrawal of the rejection.

CONCLUSION

In light of the foregoing, Applicants submit that the application is now in condition for allowance. The Examiner is therefore respectfully requested to reconsider and withdraw the rejection of the pending claims and allow the pending claims. Favorable action with an early allowance of the claims pending is earnestly solicited.

Respectfully submitted,

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Exhibit A

United States Patent and Trademark Office

Assignments on the Web > Patent Query

Patent Assignment Abstract of Title

NOTE:Results display only for issued patents and published applications. For pending or abandoned applications please consult USPTO staff.

Total Assignments: 1

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Inventors: SHUNJI HYODA, MASAHARU KITA, HIROTOSHI SAWADA, SHUICHI NEMUGAKI, TAKAHIRO UETA et al

Title: PROCESS FOR THE PREPARATION OF 5,5' -BI-1H-TETRAZOLE SALT

Assignment: 1

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